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MEMOIRS

OF THE

PEABODY MUSEUM OF AMERICAN ARCHAEOLOGY AND ETHNOLOGY, HARVARD UNIVERSITY.

VOL. I.—No. 2.

CAVE OF LOLTUN,

YUCATAN.

REPORT OF EXPLORATIONS BY THE MUSEUM, 1888–89 AND 1890–91.

BY

EDWARD H. THOMPSON.

CAMBRIDGE:

PUBLISHED BY THE MUSEUM.

1897.

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EDITORIAL NOTE.

During a visit to Yucatan in 1888, Mr. Charles P. Bowditch was impressed with the importance of archaeological research in this land of ancient culture. On his return to Boston, he interested several friends of the Museum to join him in the project of carrying on explorations in this region under the auspices of the Museum. Mr. Edward H. Thompson, who, as United States Consul to Merida, had been living in Yucatan for several years, was engaged to direct and to conduct the work on the part of the Museum.

The first expedition left Merida on December 3, 1888, for the Ruins of Labná, where the work was carried on during the winter and spring. The second expedition started in the autumn of 1890, and continued the exploration of these ancient ruins for several months. Important discoveries resulted from the explorations, and many interesting photographs and moulds were secured. A survey was made and a plan drawn of the group of ruins. A report on the Ruins of Labná was prepared by Mr. Thompson, but circumstances have not yet permitted its publication.

On the first page of this Memoir is a small outline map of Yucatan showing the relative position of the principal ruins and of the Cave of Loltun.

Mr. Henry N. Sweet, photographer, and Mr. Clifton H. Paige, civil engineer, both of Boston, arrived at Merida the last of November, 1888, and the expedition soon started for the Cave of Loltun on the way to Labná. Here for some days during the heavy rains the explorations were carried on. Photographs of different parts of the cave were taken, several of which are reproduced in the plates accompanying the following report. A survey was made of portions of the cave, and a few of the plans are reproduced in the following pages.

The second expedition to the Cave of Loltun was in December, 1890, when several passages and chambers, not previously entered, were examined. On this expedition Mr. Marshall H. Saville, of the Peabody Museum, assisted Mr. Thompson in the explorations. Additional photographs were

taken by Mr. Saville. The most important of these is the sculptured human figure which is here reproduced as Plate VI. On Plates VII. and VIII. are photographic reproductions of numerous objects found in the cave, and referred to in the text. A few other cave specimens of peculiar interest are shown in the text by drawings made by Mr. C. C. Willoughby.

The discovery of filed teeth in the cave is of particular interest, owing to the fact that these teeth are filed in the same manner as those in a skull found under one of the ruined buildings at Labná. Similarly filed teeth have been found in several other places in Mexico, and they evidently represent a peculiar custom of a certain group of the ancient Mexicans. The ethnic importance of the several styles of filing and ornamenting teeth, as shown by specimens in the Museum, will be considered in a special paper.

As the manuscript for this report was prepared by Mr. Thompson in 1891–92, it is thought best to print it without any reference to the recent explorations in this cave by Mr. Henry C. Mercer. It will be seen that Mr. Thompson was the earlier explorer, although the publication of his report has been so long delayed. It is due to Mr. Thompson to state that, owing to his residence in Yucatan, he has not had the opportunity to revise the proof of his report.

F. W. PUTNAM,
Curator of the Museum.

Harvard University, Cambridge,
May 26, 1897.

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CAVE OF LOLTUN.

REPORT OF EXPEDITION OF 1888–89.

After a week of preparation in Merida, the members of the expedition * went on to Ticul where they were heartily welcomed by Don Antonio Fajardo whose genial face and kind courtesy are most pleasing remem-

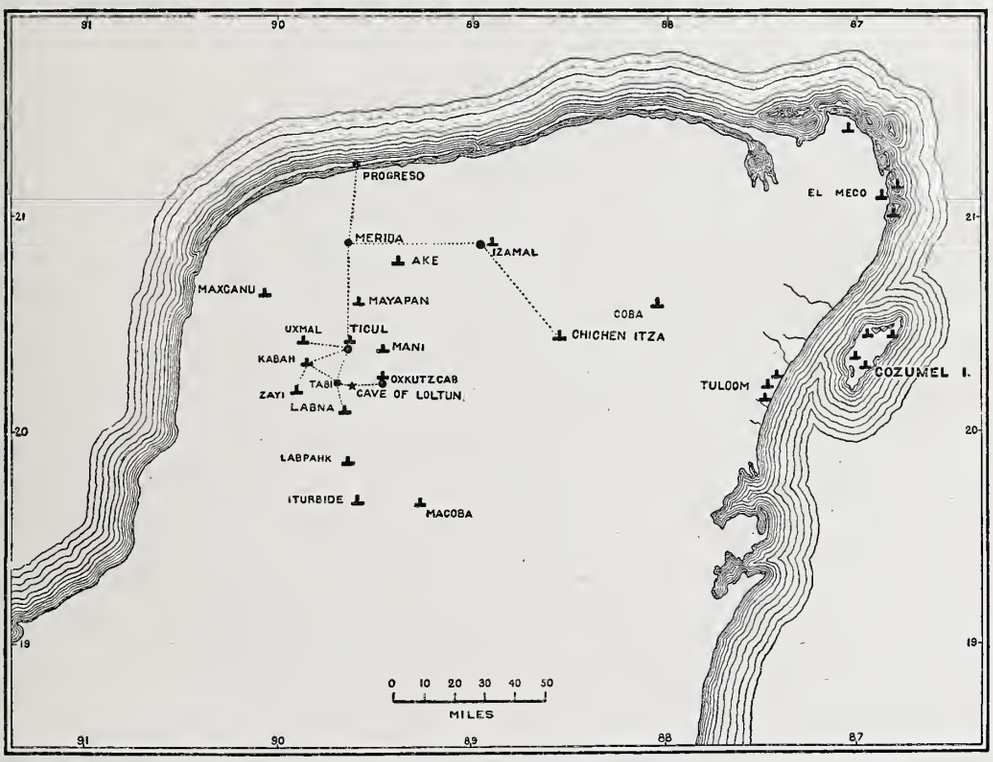


Fig. 1. — Map of Yucatan.
The dotted lines show routes taken by the Peabody Museum Expedition of 1888–1891.

brances of the winter's work. Having partaken of an excellent dinner with his pleasant family, we entered the volans, each drawn by a trio of mules, and were soon on our way to the frontier hacienda of Tabí, whose

* Consisting of Edward H. Thompson, *Director;* H. N. Sweet, *Photographer;* Clifton H. Paige, *Civil Engineer.*

long fields of sugar-cane fringe the line between civilization and the wild lands.

Arriving at Tabí, sixteen miles to the south of Ticul and sixty-eight to the south of Merida, where the kindness of Señor Fajardo had placed everything at our disposal, a midnight lunch was served, and hammocks were called into requisition. During the night there were heavy showers. The next morning the cloudy skies promised more rain, but although the forests paths were flooded, we were unwilling to lose valuable time and determined to press on. The Cave of Loltun, situated a league to the east of Tabí, was one of the places to be investigated. Once in the cave, the state of the weather would be a matter of indifference to us. The work could go on without loss of time. Candles, ropes, and provisions were therefore packed, all due preparations made, mules obtained, and before many hours the members of the expedition were at work, each in his department, nearly a hundred feet underground.

Loltun, or the cave of the flowers of stone (Plate I. Fig. 2), is the poetic name given to this cave by the natives. In a region more accessible to tourists it would be world-famed. Its long passages, buried in the depths below, dark as a tomb and as silent, suddenly open into roofless grottos, sun-lit from above, framed in by huge tree-roots and vines, and perfumed by thousands of flowers, that, nourished by the rich, damp soil below, are quickened into fragrance and beauty by the hot sun's rays descending from above.

Several of these grottos, when the sun's rays have the right inclination, are suffused with tints of pale green or rose, rivalling in beauty the famed Blue Grotto of Capri. There are, it is said, eleven of these openings, or mouths, through which the sunlight descends and creates a veritable fairy land.

Entering a mouth, an ancient entrance (Plate I. Fig. 1), as is evidenced by the much-worn stone path-way, the descent is made by primitive ladders, — tree-trunks felled and placed in position, with rounds made from the tree limbs which, placed in notches cut in the tree-trunks by the aid of machetes, are firmly bound in place by the running vines or bejucos that grow in profusion around the spot.

Arriving at the bottom, after the eyes are accustomed to the twilight effect of the surrounding atmosphere, various evidences of man's previous occupation are seen in the *haltunes*, or water troughs, hollowed out of stone bowlders, some holding a quart, others several gallons of the water that, drop by drop, percolates through the roof of the cave. On several sides are constructions that tell of defence and war, barricades roughly built but strong and admirably placed to defend the entrance and prevent surprise to those within (Fig. 2).

This cave, the natives tell me, was used as an occasional refuge

by the Indians during the "War of the Races" in 1847, and these barricades may have been constructed by them at that period, but I doubt it. I believe that, while they may have been made use of by these refugees, they were constructed at a much earlier date, probably by the same people who inscribed the hieroglyphs and symbols upon the walls and bowlders of the Inscription Chamber (Chamber 3) to be described further on.

I find the lowest stones of these barricades to be, on an average, buried about eight inches below the present floor. This was not because a slight excavation had been made within which to place the foundation stone, and that a comparatively slight subsequent accumulation had served to give the depth, for careful examination showed that the stones had been simply laid upon the surface and the barricade erected with a front filling of stone rubble. The material which accumulated above and around these base stones may safely be said to have accumulated since their construction, not, as in the case of the ruined edifices, since their disuse or destruction.

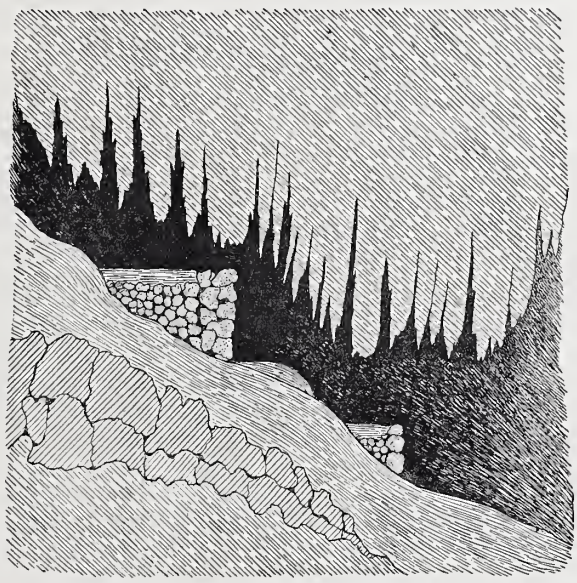


Fig. 2. — Vertical Section, showing Barricades.

In this accumulation are found quantities of potsherds. The first four inches from the level of the present floor contains comparatively few, except where the action of running water had changed the natural order of things. The remaining four inches, extending down to the ancient floor upon which the barricades rest, contains large quantities of them. Most of these potsherds are undeniably of ancient origin.

These barricades were probably garrisoned by persons constantly on guard to prevent surprise. This garrison, naturally, used clay vessels for many purposes; their food was cooked and probably brought to them in clay vessels; these, by accident, became broken, and the larger fragments were used as receptacles, as is the custom to-day; the remainder were trampled underfoot as refuse, and became a part of the general accumulation. When the cave was abandoned, the accumulation went on, but free of potsherds, and only by agencies in which the hand of man had no part.

Thus we can believe that the layer of material plentifully mixed with

potsherds represents the intervening period between the construction of these barricades and their abandonment as a defence; and, as I have noted, this act was probably coeval with the abandonment, as a habitation, of the cave itself. The layer free from potsherds would then represent the intervening period between the date of abandonment and the present day.

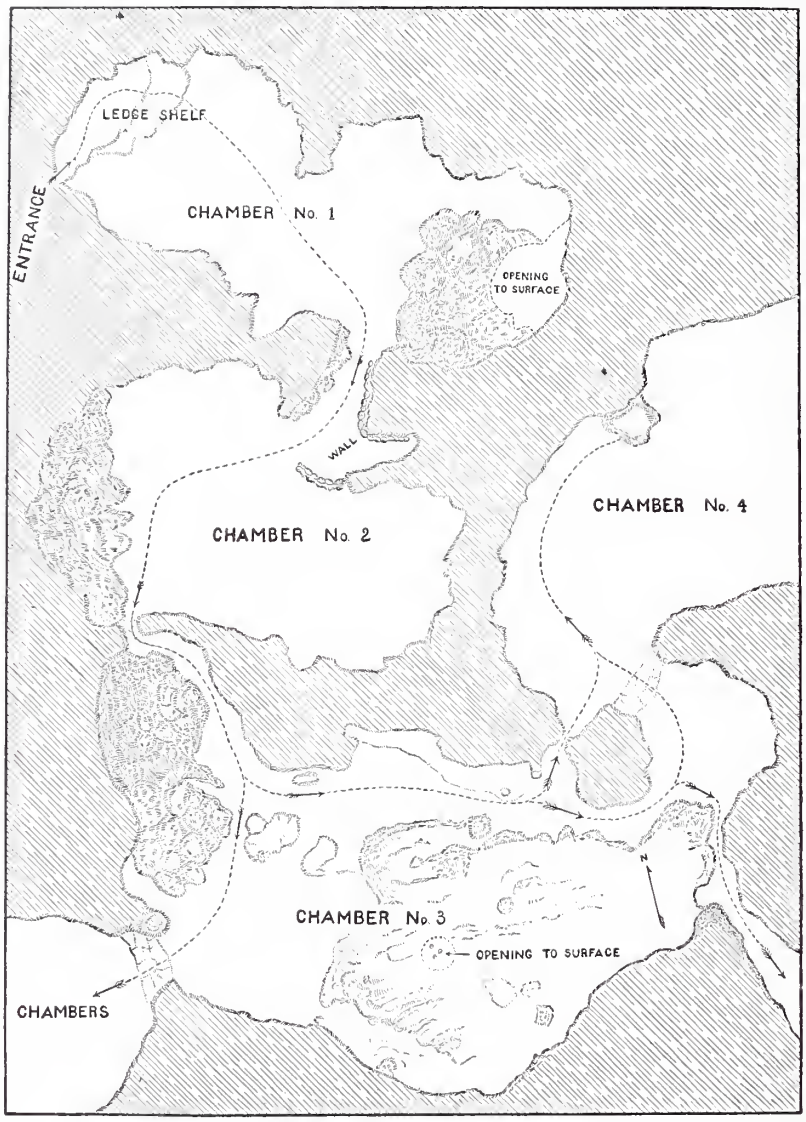


Fig. 3. — Plan of the Principal Chambers of the Cave of Loltun.

It is to be remembered that while the two portions of the accumulation before mentioned are of equal thickness, each four inches, it does not follow that equal periods of time were necessary to produce them. As a factor in the process, man would undoubtedly, by his movements and the pressure of his feet, render the accumulation more dense and compact

FIG. 4. — PLAN OF CHAMBER 3 (INSCRIPTION CHAMBER), CAVE OF LOLTUN.

than would the constant, yet gentle, pressure exerted by the natural weight of the material of the stratum under normal conditions.

Thus four inches of accumulation effected when man was a factor might well indicate the deposition of double the actual material contained in the four inches of accumulation effected when man was not a factor. On the other hand, the very presence and needs of man cause depositions to accumulate, when not removed, at a rate much greater than by the normal processes of nature.

Passing through chambers 1 and 2 (Fig. 3), we entered a passage-way, the floor and walls of which are of a burnt-umber color, and absolutely non-reflective, making a gloom that the torches and candles seemed only

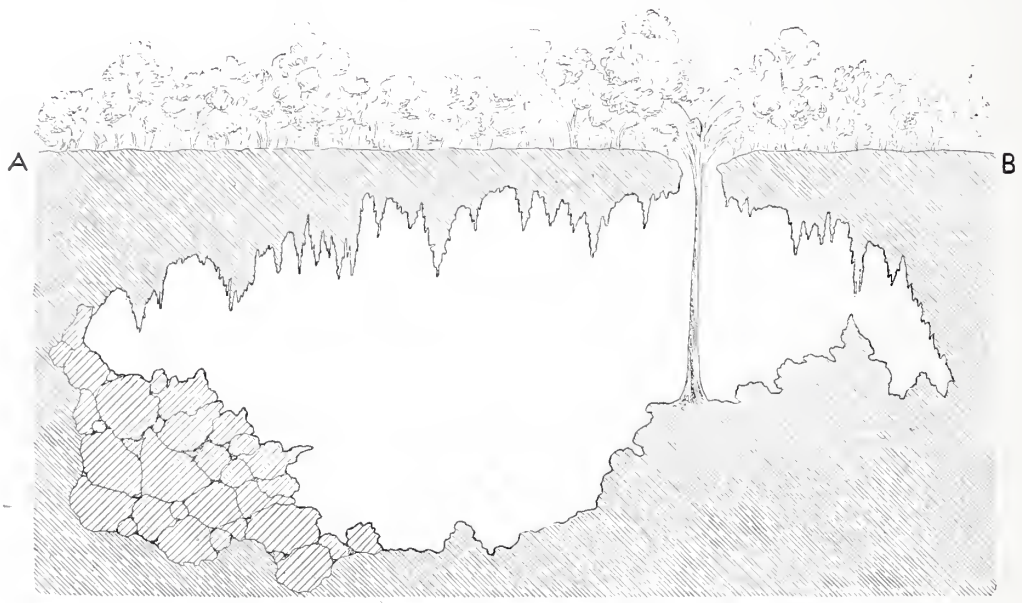


Fig. 5. — Vertical Section through Chamber 3, Cave of Loltun.

to emphasize and not to illumine. This passage-way opens into Chamber 3. In the southern portion of the domed roof there is an immense circular opening, and through it the light passes and illuminates the chamber that would otherwise be in impenetrable darkness. This we named the "Inscription Chamber" because of the inscriptions and devices carved upon the walls and bowlders.

At the very entrance of the chamber (Fig. 4), the vertical wall is covered to the height of six feet with lines of hieroglyphs (Plate II. Fig. 1). These were probably never engraved very deeply into the stone surface of the wall, and are now in places rendered almost invisible by the disintegration of the surface of the rock. In many places in the cave the exceedingly low relief of the inscriptions could be explained by the theory that the same agencies that produced the stalagmites, and covered the

walls with a coating of lime, coated the inscriptions, also, and thus reduced them to scarcely perceptible outlines. But the inscriptions in Chamber 3 appear to have been carefully engraved upon certain portions of the walls where the accumulation was not forming. A thin coating of green mould one-eighth of an inch thick is the only formation that tends to hide them from view or lower their relief. If any inscriptions were engraved on the portions of the walls where the deposition of lime was taking place, all signs of them have disappeared.

These inscriptions are in partial obscurity; the entrance path winds directly in front of them, so near that, even without the instinct to press close to a solid guiding surface while in the darkness, the passer-by would brush against them, and thus aid in the erosion of the surface and gradual effacement of the characters upon it.

Entering the chamber itself, and continuing to follow the line of the left-hand wall, various devices are seen carved upon its surface, ending in a series of hieroglyphs or symbols (Inscription 2) at the extreme end of the inscribed wall surface. These are placed about six feet above a large bowlder, upon the sides of which rough steps had been hewn (Plate III. Fig. 1).

About eighty feet to the southeast of this bowlder is a large rock upon which is Inscription 4, a and b (Plate IV. Figs. 1 and 2). A short distance to the northeast of Inscription 4, upon a bowlder beneath the overhanging rock, is Inscription 3 (Plate V.); while upon the rising ground to the south, and nearer to the opening in the roof above, are other bowlders bearing graven characters and unknown symbols (Inscriptions 5, 6, and 7). As the graven devices mentioned above are much more clearly shown by the accompanying photographs than they would be by any words or drawings of mine, I shall not attempt a detailed description (Plate II. Fig. 2, Plate III. Fig. 2). A peculiar character carved upon the eastern face of one of the bowlders (Inscription 4, a) merits special attention and has caused me much thought. Its peculiar contour and general character almost irresistibly impel me to believe that it indicates a body swathed in mummy clothes (Plate IV. Fig. 1); and yet nowhere else in my researches among the vestiges of prehistoric man in Yucatan have I found aught that would lead me to believe such a custom ever existed in Yucatan.

It is also a fact that these cave chambers have innumerable niches and cavities, many of which still retain an evidently artificial form. These would be the places most suitable for the deposition of the bodies or mummies.

One cavity in particular attracted my attention. It was in the centre of a huge stalagmite that rose from the floor until it joined an almost as large stalactite pendent from the roof above. At a distance of eight feet from the surface upon which the stalagmite rested, I noted an orifice, evi-

dently shaped by human hands, in the centre of the surface of the stalagmite, in such a position that it faced the opening in the roof through which the light entered. Ascending close to it in order to examine it, I found that the orifice opened into a cavity just about large enough to hold a human body. The floor of this cavity was reasonably smooth, and the whole appearance was such as to lead me to believe it to have been a work of nature aided very much by the hand of man.

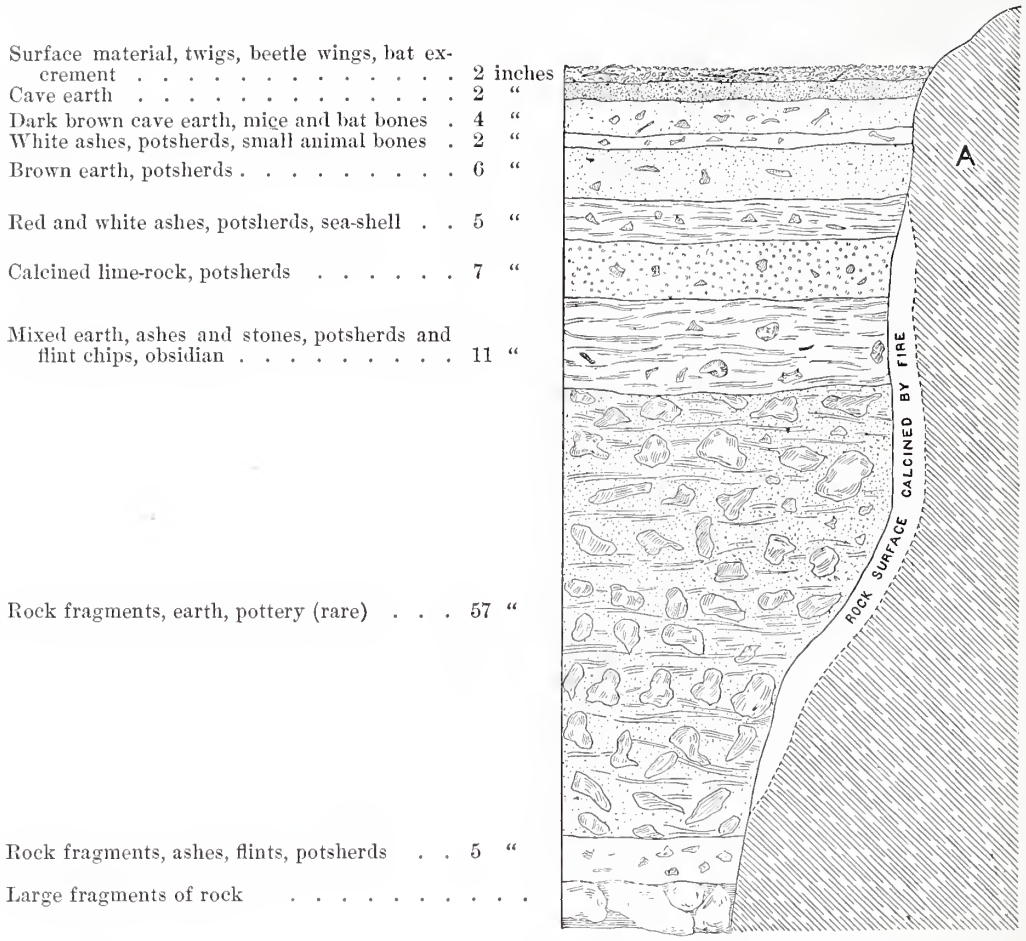

Surface material, twigs, beetle wings, bat excrement . . . . . 2 inches
Cave earth . . . . . 2 "
Dark brown cave earth, mice and bat bones . 4 "
White ashes, potsherds, small animal bones . 2 "
Brown earth, potsherds . . . . . 6 "
Red and white ashes, potsherds, sea-shell . . 5 "
Calcined lime-rock, potsherds . . . . . 7 "
Mixed earth, ashes and stones, potsherds and flint chips, obsidian . . . . . 11 "
Rock fragments, earth, pottery (rare) . . . 57 "
Rock fragments, ashes, flints, potsherds . . 5 "
Large fragments of rock . . . . . .
A
ROCK SURFACE CALCINED BY FIRE

Fig. 6. — Vertical Section showing Layers Exposed by Excavation No. 1.
Scale, $\frac{1}{2}$ inch = 1 foot.

In none of these cavities, of which I examined more than a hundred, did I discover any traces of human remains. If any had been placed within they had been removed before I made my examination.

I made an excavation (No. 1) close by the rock upon which the device described as resembling a mummy had been carved. This excavation (Fig. 6) had a length of ten feet and a breadth of six feet directly in front of the carving. The first layer of surface accumulation excavated was two inches deep, and consisted of twigs and leaves blown in by the winds

that eddied in the huge opening above; with these were half-gnawed nut-shells, fruit seeds brought in by cave mice and by fruit-eating bats, and bat excrement.

Buried in this accumulation, eight-tenths of an inch below the surface material of the cave, we encountered a small disk of iron, thin and with a hole in its centre. It resembles very much the eye of a rivet, and its presence can probably be explained by the fact of its once having formed a part of the gun of a refugee, or of some native hunter who entered the cavern to hunt the jaguars or the immense serpents that the natives say hide in the abysses that abound on every side.

The second layer, also two inches deep, is of the same general nature as the first, but more decomposed and dustlike.

The third layer, four inches deep, is of dark-brown earth, damp and mixed with stalactite tips and the ever-present bones of bats and cave mice.

The fourth layer, two inches deep and well defined, consists of pure white ashes, in which were encountered potsherds, and close by pieces of bones of small animals not charred by fire. The potsherds are of the plain and striated pattern found in abundance throughout the excavations among the ruined buildings.

Below this stratum of ashes occurs a layer of six inches of brown earth, followed by a second stratum of red and white ashes from three to five inches thick, much intermixed with earth, bits of lime-rock, potsherds, and bones of small animals; in this mixed matter were found a tooth of an animal and a sea-shell. This layer of ashes had evidently been subject to some disturbing influences; the earth immediately under and above had been ground into and well mixed with it, thus making it a difficult matter to ascertain where the line of ashes began and ended.

A layer of seven inches of lime-rock, decomposed by fire and intermixed in plentiful confusion with potsherds of the usual plain and striated patterns, then intervenes, followed by eleven inches of ashes, earth, and lime-rock. At this point the inclined plane of the rock (A) shows unmistakable signs of having been at some period subjected to such a heat that a large portion of its face has been converted into soft and friable, calcined stone. Below the last mentioned layer was one of earth, ashes and stones, in which were found a piece of an obsidian knife (no obsidian exists naturally in Yucatan), a cylindrical bead of burned clay of a jet-black color, a sea-shell, and many pieces of pottery.

In the succeeding 57 inches of deposit there was a simple commingling of lime-rock, fragments of earth, and very rarely a piece of pottery.

At a depth of eight feet from the surrounding surface was encountered an irregular layer of ashes having an average depth of five inches. These ashes were compressed by time, and the superimposed accumulations, into

hard, compact laminations that seemed to have been the result of many fires. Directly under these ashes, in fact, embedded in the lower stratum, were found various potsherds, plain and striated ware, and several chipped flints. No trace of bone or any organic matter exists within this stratum of ashes, so far as we could ascertain.

Below this last layer of ashes was encountered a mass of rock fragments and bowlders. Penetrating into this to a depth of two feet, nothing of interest was found, and for the time, at least, this excavation was abandoned.

The above excavation is one of nine, all yielding practically the same results down to a depth of four feet, when in the majority of cases the evidences of man's handiwork ceased.

In an excavation made in front of the large bowlder that faces Inscription 2, at a depth of twenty-six inches below the present cave bottom, we encountered a peculiar object of hard-burned clay, possibly a stamp or seal. This object is circular, a little over one and a half inches in diameter, with a flat face and reverse plain, with a knob in the centre as if to serve as a handle. On the flat face is incised a spiral pattern, and its edges are scalloped (Plate VII. Fig. 1 a). This device, or symbol, in its convolutions bears a considerable and probably intentional resemblance to certain of the devices that appear carved on the rocks and bowlders around, and upon the wall of the chamber. What signification this peculiar symbol has, is to me unknown; but, from the presence of some bright red pigment in the convolutions, I am inclined to believe that it was used to stamp the emblem upon some other object. This red pigment is possibly vermilion, as Mr. Alfred Maudslay assures me that he has found both the vermilion and the metal mercury in the ruined groups of Quirigua and Copan.

In making these excavations, great care was taken that the work should proceed in such a manner, and in such locations, that no false conditions could exist to injure the value of the information gained.

For example: the rains, as they fell, evidently entered the huge opening above in torrents, and, in certain localities, washed all before it, thus disturbing the natural arrangement of the accumulations, and, to a certain depth, mixing everything in inextricable confusion. Moreover, evidence was not wanting to show that, in times past, other water-sheds had been formed, and that water once flowed down the descending sides of the high portions of the accumulations upon the floor of the chamber in different channels than at present. This change may have been artificially produced by the inhabitants of the cave; but I believe that it was generally caused by the falling of masses of material from above, whereby, the old channels becoming choked up, the water was forced into others. As the object of this expedition was to observe the actual deposits as they

were originally formed, the places where this erosive action, whether of the past or present, was noted, were avoided.

It is worthy of note, as an interesting fact in connection with the query as to the amount of time necessary to produce such an accumulation of ashes, that Chamber 4 is considerably lower than Chamber 3; consequently, the rush of water during the rainy season washes from Chamber 3 down and into Chamber 4, where it is lost in the deep chasms that abound on all sides. The entire bed of the torrent is one solid mass of wood ashes and charcoal, almost free from earthy matter, but containing great numbers of potsherds, and I doubt not, if thorough search was made, many other interesting articles could be found embedded in the compact mass. It is several feet thick and of unknown width and length. It is covered with a superficial accumulation of *brown earth*, two feet deep.

Fig. 7. — Haltun, or Stone Water-trough, covered with Stalagmite.

In the passage-way, or sub-chamber, connecting chambers 3 and 4, is a beautiful work of nature. The native who first showed it to me called it the "baptismal font," and the name is very appropriate. A cylindrical pedestal of glistening, snowy-white material, with fluted sides and base, stands close by the wall of the passage. The centre of this column is hollowed, and in its beautifully curved top a cup-like cavity is formed, half shielded by a transparent veil of stalagmite. Not a drop of water is said to enter the cup from above, and yet it is always full of cold water, and the sides of the column are never free from the overflowing moisture. A reservoir, or conducting canal, naturally formed in the wall, contiguous, undoubtedly connects with it, and thus keeps it perpetually filled with water of almost an icy coldness. This phenomenon of naturally produced cold water, in a land where the water as it bursts forth in springs is actually tepid, would, if near to Merida, bring a fortune to its lucky owner. As it is, none but the occasional Indian sees the beauty of the reservoir and enjoys its refreshing contents.

In this passage-way, or sub-chamber, is a second phenomenon of considerable interest, and in this the hand of man can claim to have exerted a controlling influence. A large "haltun," or stone water-holder, holding several gallons, had in the unknown past been raised upon a base of

several large stones until it was at an altitude of four feet from the cave bottom of to-day, and directly under a spot where the drops of percolating water fell; in time the percolation not only filled the haltun with water, and thus supplied the means with which to quench the thirst of the cave-dwellers, but coated the whole structure — base stones and haltun inside and out — with a transparent and thin, but constantly increasing, coating of lime. To-day the structure stands, a solidified, rounded mass of white lime. Through the several inches of transparent envelope the ancient haltun can still be seen.

Fig. 8. — Rock Carvings, Cave of Loltun. $\frac{1}{8}$.
After tracing by E. H. Thompson.

Within the northern wall surface of Chamber 3, there is a small opening leading into a large cavity, in fact a small chamber capable of holding comfortably several persons. The opening from the large chamber into this small one is skilfully barricaded and made smaller by large stones so arranged as to appear to be the work of nature, and this effect is heightened by the uniform film of mould dust that covers all the lower portion of the cave. In one corner a haltun, or water-trough, had been cunningly sunk into the floor surface and projected so far each way that the water dripping constantly from the stalactite points of the outer wall could be utilized by the occupants of the chamber without detection or exposure. In another corner, charred wood and ashes were found, beside postherds and flint chips. This instance is but one of many similar ones that are seen in the chambers of the cave.

Fig. 9. — Rock Carvings, Cave of Loltun. $\frac{1}{8}$.
After tracing by E. H. Thompson.

I have found a great many of these haltunes in various portions of the cave. Chamber 3 contains the largest number of any of the chambers I have visited.

In order to furnish data for the future worker, we took a haltun of ordinary size, the present location of which is about twenty-five feet northwest of Inscription 7, and carefully removed the crystalline envelope of lime. This coating, two and one-half inches thick upon the outer rim of the cavity, three and one-half inches thick on the inner bottom, and one and one-fourth inches thick upon the outside structure of the haltun itself, was removed with considerable difficulty. This accomplished, the legend "E. 1888" was

chiselled in letters half an inch deep upon the side of the haltun nearest the passage-way. The haltun was then restored to its original position, and left until succeeding years, possibly centuries, and renewed deposit shall make it serviceable to science by recording the rate of stalagmitic deposit.

The entire year might be spent in this cave with good results to science; but it was not deemed advisable to spend a long time during one season in the cave. Constant exposure to the cold, damp air and the sudden changes of temperature, as each day the laborers ascended and descended, caused coughs and colds until, from pure humanity for the health of our faithful natives, we were forced to leave cave work, and migrate to the high and drier region surrounding the Labná group.

REPORT OF EXPEDITION OF 1890–91.

December 1st of the season of 1890 found us again at the cave.*

The engineering work done by Mr. Paige, and the excellent photographs made by Mr. Sweet, during the previous season, enabled us to get started on direct investigation in a very short time.

About half-way down the descent from the surface to the first chamber, there is a ledge shelf, or cleft, so deep and sheltered as to be

Fig. 10. — Perforated Shell. ½. Ornament.

Fig. 11. — Perforated Shell. ½. Ornament.

almost a chamber. This seemed a promising field for investigation, as its position would naturally lead us to expect fruitful results.

Carefully dividing the shelf floor into sections, for systematic investigation, we commenced the excavation. The earth as it was dislodged was carefully inspected *in situ*, and the sides of the cuts carefully examined and worked into with hand, brush, and small trowel. The observations were minutely made and noted, and the loose earth was carefully sifted.

* The expedition this season consisted of Edward H. Thompson, *Director*, and Marshall H. Saville, *Assistant* and *Photographer*.

The accumulated deposit upon the shelf was naturally much less in depth than that upon the chamber floor. In no spot was it over three feet, and the average depth from surface to bed-rock was one foot and three inches; for the first three inches it was a composite of bat excrement, bird feathers, mole, bat, and rat bones. Potsherds, few in number, were found where the rains had worn away the upper deposit of material.

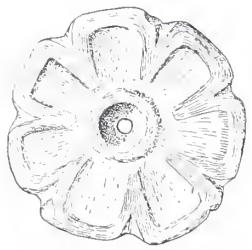


Fig. 12. — Ornament carved from Shell. ½.

The second three inches consisted of fine dust, stalactite tips, small animal bones, and many teeth and snail-shells.

Beneath these two superficial deposits commenced the actual traces of the ancient people who made this cave, if not a home, at least a station in their life's journey.

The contorted surface of the floor of the shelf made any epoch-marking stratification impossible.

Beneath this detritus of six inches was a thick stratum of mingled earth, potsherds, and fragments of rock. At a depth of five and ten inches beneath the surface of this deposit I thought I could detect somewhat regular deposits of ashes approaching true culture layers, separated by a depth of two inches of brown earth and rock fragments; but these strata, if strata they are, were so broken by faults as to make authentic data of the kind impossible.

This small chamber, barely five feet square, yielded rich results, much richer, relatively, than the excavations in the Inscription Chamber.

We had the good fortune to encounter two small hollows in the bed-rock that evidently had once served as "caches." One of them held several of the handsomest obsidian knives that I have ever seen; while the other held many chalcedony chips, evidently newly chipped and unused when buried. One of these obsidian knives was presented to Don Antonio Fajardo, for the owner of the lands embracing the Cave of Loltun, and the remainder are now among the specimens at the Museum. Two of these are illustrated on Plate VII. Fig. 2 a.

Fig. 13. — Ornament carved from Shell. ½.

Fragments of an elaborate incense burner, portions of which still hold the bright colors of red and white, are among the interesting objects exhumed; also, a very artistic ornament of pink shell, carved in the form of a flower (Fig. 12).

Chipped flint implements, fragmentary objects of burned clay, some still showing bright colors, ornaments carved from pearl and conch shells, clay pellets like the nineteenth-century boys' marbles (Plate VII. Fig. 1 b), bone awls and needles, beads and unworked pebbles of yellow stone, hammer stones, and broken spear-points are among the specimens brought

to light by the excavation of this shelf chamber. Many of these specimens are illustrated upon Plates VII. and VIII.

In the mingled ash and refuse material, filling a hollow in the rock floor six feet from the west wall and nine feet from the south, were found fragmentary portions of human bones, much decayed, and human teeth filed into curious forms.

Close by these bones were little heaps of hard clay pellets, resembling marbles, which probably were the pellets that once served as sounders in the hollow feet of tripod vessels, of which our excavations of last season gave the Museum several fine examples.

The floor of Chamber 3 was marked into sections for systematic working, as in the previous instance. The sections excavated were thus worked down to hard-pan, or rock bottom. In places this is a hard-packed, yellowish earth of an ochreous nature, totally unlike the red earth of the surrounding country. In others, it is a crystalline limestone. This hard-pan is also subject to great inequalities. In places it is barely three feet beneath the surface. In others, not many yards distant, it has several times that depth. It seems to consist of ancient channels, probably hollowed out by the action of running water when the cave was new, and of ridge-like protuberances, — gigantic stalagmites.

Fig. 14. — Carved Stone Pendant. $\frac{1}{1}$.

The average depth of excavation made this season was four feet, although many side and test excavations reached a much greater depth. These excavations were made and worked with great care, under the constant supervision of Mr. Saville or myself. The earth, before it was dislodged, was subjected to careful inspection *in situ*, and suitable observations were made and noted. The earth material was then taken in baskets and carried to a large sieve, where, as it passed slowly through the meshes, it received a searching investigation.

Many side and test excavations were made in order to study the extent and character of the deposits. These excavations were either narrow trenches or circular pits reaching down to the actual bed-rock, and in cases where the rock bottom gave an uncertain sound as if it might be a rock fallen in early times from the roof, and not the actual floor, long steel tapping chisels, nine feet long and a half-inch in diameter, were brought into use. They cut into the lime rock easily and quickly, and soon proved the truth of the matter. In one place we drilled seven feet into the floor, and as at that depth a light steel test-rod rang as clear as a bell, we knew there was at least two yards more of solid rock material, and we concluded to accept as a fact the idea that we had encountered the primitive floor of the cave.

After our work was finished, in deference to the expressed wish

of the owner of the hacienda, the deeper and consequently dangerous, excavations were refilled.

As the result of our work upon this chamber floor, we obtained potsherds of various patterns (Plate VII. and VIII.), also obsidian points, clay beads, flint implements, flakes, jade beads, carved stone, clay and shell neck pendants, fragments of carved pearl and conch shells, together with human bones; among the interesting objects are several bone needles, beautifully formed and polished (Fig. 15), some of which are double pointed. These various objects were not found in any particular spot, but were scattered here and there, and encountered, as the work progressed, at an average depth of nineteen inches beneath the present surface. Flint flakes and potsherds were also found at a much greater depth.

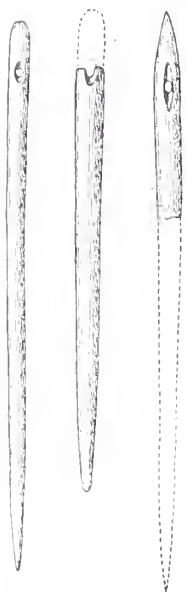


Fig. 15. — Bone Needles. $\frac{1}{1}$.

Three very distinct and general layers of ashes were at depths, respectively, of six inches, sixteen inches, and thirty-one inches. Below these layers of ashes others were found at varying depths. These were local in character, containing diminishing quantities of flint flakes and potsherds, the latter being either plain or of the reed-marked pattern. Several fragments of human skulls were found. Among the fragments were human teeth filed into curious shapes (Fig. 16). The pieces were scattered over an area several yards square, and do not seem to be fragments of one skull. This dispersion of fragments does not seem to be due to later disturbance of the layer in which they were found, but rather to have taken place at a time preceding the natural deposition of the matter immediately above them. Almost all the articles, with the exception of the potsherds and animal bones, are of a character that, while they might be lost, they would hardly be thrown aside as useless.

Fig. 16. — Human Teeth, with Filed Edges.

Flint is scarce in Yucatan, and obsidian is not found at all, and these fragments, serviceable, however small, would not be thrown away as refuse. Such articles, as well as the jade beads, pendants, and bone needles, were probably lost from time to time and buried in the general deposit.

An object of special interest is a fragment of a whistling vessel, like those of Peru and Costa Rica; several fragments of the hard, black, thin ware were found, but the fragment mentioned contains the whistle intact (Fig. 19). The only other specimen in any way similar, that I have seen in Yucatan, is now in the Museum at Merida, and of this

through the kindness of the Director, I have been able to send to the Museum a facsimile in plaster. The ware is not of the kind made either in the past or present of Yucatan, so far as our present knowledge extends, and it would appear that these vessels were ancient importations from a distant nation.

From time to time, as the work went on, explorations were made into the distant passages of the cave, and new wonders were constantly revealed to us.

Fig. 17. — Rock Painting, Cave of Loltun. $\frac{1}{14}$.
From sketch by M. H. Saville.

Upon the walls of a tunnel-like passage with a general trend to the northwest, we found curious symbols outlined in black pigment, showing remarkably clear and distinct against the yellow-white surface of the stone wall.

One distant chamber, approached after many turns in the inky darkness of the tunnel, had death's heads carved upon the wall surface, and the many projecting knobs of stone were so carved that grinning skulls confronted one at every turn. Thorough search in this grewsome chamber failed to reveal graves or any evidence that it had ever served as a burial-place for the dead.

In another chamber the projections were fashioned in the shape of tigers' heads instead of death's heads.

As we followed the long, winding passage, a faint gleam of light became visible in the distance. Following up the clew, we found ourselves at the mouth of a long tunnel, or passage, at the very bottom of a great well-like cavity in the earth. The hot sun poured down into it, and great trees, laden with vegetable parasites, shot upwards into the sunlight of the upper world.

Fig. 18. — Rock Painting, Cave of Loltun. $\frac{1}{14}$.
From tracing by M. H. Saville.

Upon the left of this great black opening from which we had just emerged, and stood blinking and winking in the sunlight, a portion of the rocky wall that loomed up sheer around us for forty feet or more had been partially smoothed and upon its surface had been carved in low relief the richly clad figure of a warrior or priest of heroic size (Plate VI.). This majestic figure, with flowing plumes, jewelled penache, and long lance in hand, had guarded this hidden passage for who knows how many years or centuries, and as we stood before him and studied the stern, grim outlines of the face, we felt like removing our hats in

his presence. After which, we gave him a good bath, — for the passing centuries had left him very dirty, — and then took his photograph and a mould of him in paper.

Entire seasons could be spent in this cave work, and not a day pass without the discovery of some important fact or interesting specimen. But we had accomplished the object of our researches in this, the typical cave of Yucatan. We had delved through the deposits of the present day, through the accumulations of unknown centuries, down to and into the crystalline surface of the ancient floor itself.

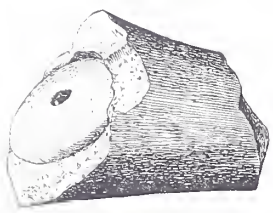


Fig. 19. — Fragment of Whistling Vessel. $\frac{1}{1}$.

Our steel chisel points had probed into the ages when, in all probability, the Peninsula of Yucatan was newly risen from the depths and none save the strange creatures of the sea knew her secret chambers. This grotto, unlike those of Montmatre and Hohenfels, told no tales of the man beast. On the contrary, from the earliest period of its use as a human habitation, the people seem to have been of the same manners, religious customs, and household habits as those who built the great structures above them now in ruins.

It would be vastly interesting, no doubt, to be able to state that split human bones, charred by fire, were found, thus proving that cannibalism was indulged in, among other strange customs; but the sober truth compels us to say, that while we found a number of human bones, some in fragments, others whole, none showed any trace of being charred by fire or any other evidence of cannibalism. And I have no hesitation in expressing my firm conviction, based not only on the evidence obtained by this investigation, but upon studies personally carried on in other caves, that no people or race of so-called Cave People ever existed in Yucatan. And that, while these caves of the Loltun type were undoubtedly inhabited, it was by the same race and people that built the great stone structures now in ruins; and I furthermore believe that the caves were only temporary places of refuge, and not permanent habitations.

Fig. 20. — Bead of Iron Pyrites. $\frac{1}{1}$.

EXPLANATION OF PLATES.

PLATE I.

Fig. 1. Principal Entrance to the Cave of Loltun.
Fig. 2. Stalactites in the Inscription Chamber (third Chamber).

PLATE II.

Fig. 1. Inscription 1 in third Chamber.
Fig. 2. Inscription 6 in third Chamber.

PLATE III.

Fig. 1. Inscription 2 in third Chamber.
Fig. 2. Inscription 7 in third Chamber.

PLATE IV.

Fig. 1. Inscription 4 *a* in third Chamber.
Fig. 2. Inscription 4 *b* on same Rock as 4 *a*.

PLATE V.

Inscription 3 in third Chamber.

PLATE VI.

Bas-relief on Wall near one of the Entrances to the Cave.

PLATE VII.

FIG. 1. Terra-cotta Objects found in the Excavations made in the Cave.

a. Stamp, with short handle upon side not shown in illustration.
b. Balls, such as are frequently found within hollow legs of vessels.
c. Globular Beads.
d. Cylindrical Beads.
e. Ornamented Bead-like Object.
f. Potsherd Discs.
g. Potsherd Discs, perforated.
h. Legs of Vessels.
i. Potsherds with painted decorations.
j. Potsherds with incised decorations.

FIG. 2. Implements of Stone found in Excavations.

a. Obsidian Knives.
b. Rude Chipped Implement of Flint.
c. Flint Knives or Scrapers.
d. Flint Scraper.
e. Leaf-shaped Knife of Flint.
f. Leaf-shaped Knife of Flint, broken.
g. Flint Knife.
h. Flint Arrowheads.
i. Fragment of Stone Implement.
j. Perforated Stones.
k. Artificially shaped Stone Balls.
l. Muller or Grinding Stone.

PLATE VIII.

FIG. 1. Terra-cotta Objects found in the Excavations. These are probably fragments of ornamental figures, and many of them are decorated in unburnt colors, including white, black, red, brown, green, and yellow.

FIG. 2. Fragments of Vessels, including Handles and Portions of Rims.

Fig. 1. — Principal Entrance to Cave of Loltun.

Fig. 2. — Stalactites, Inscription Chamber (No. 3), Cave of Loltun.

Fig. 1. — Inscription 1, Chamber 3, Cave of Loltun.

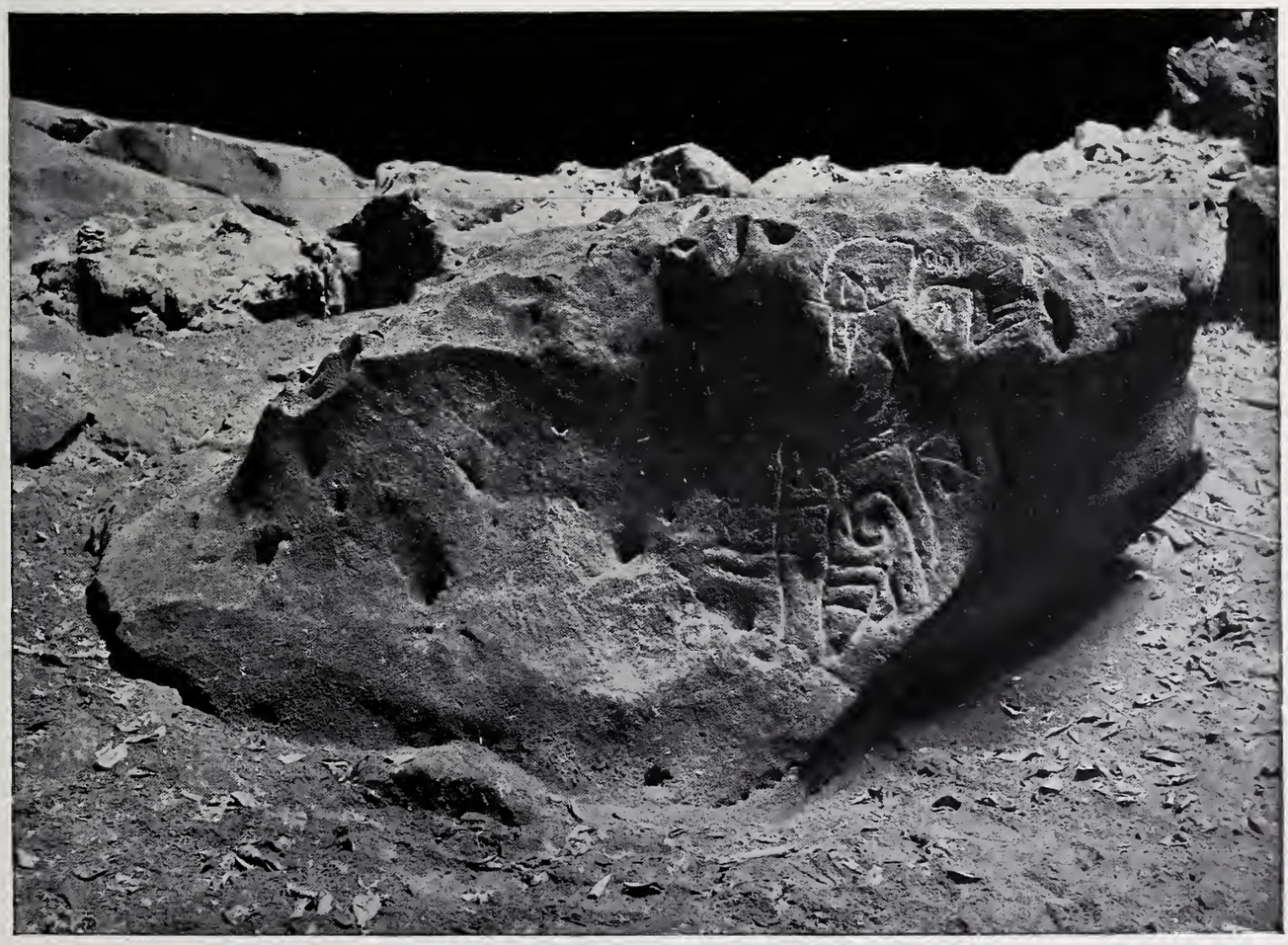


Fig. 2. — Inscription 6, Chamber 3, Cave of Loltun.

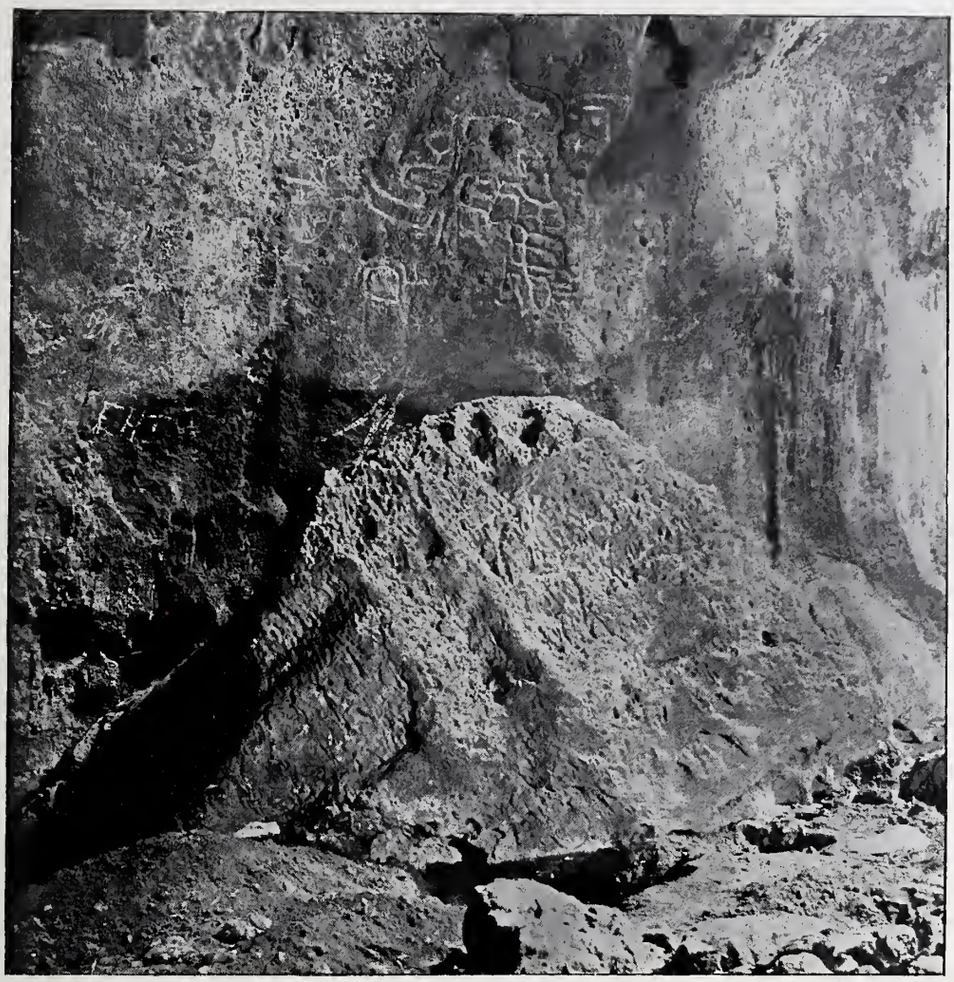


FIG. 1. — INSCRIPTION 2, CHAMBER 3, CAVE OF LOLTUN.

FIG. 2. — INSCRIPTION 7, CHAMBER 3, CAVE OF LOLTUN.

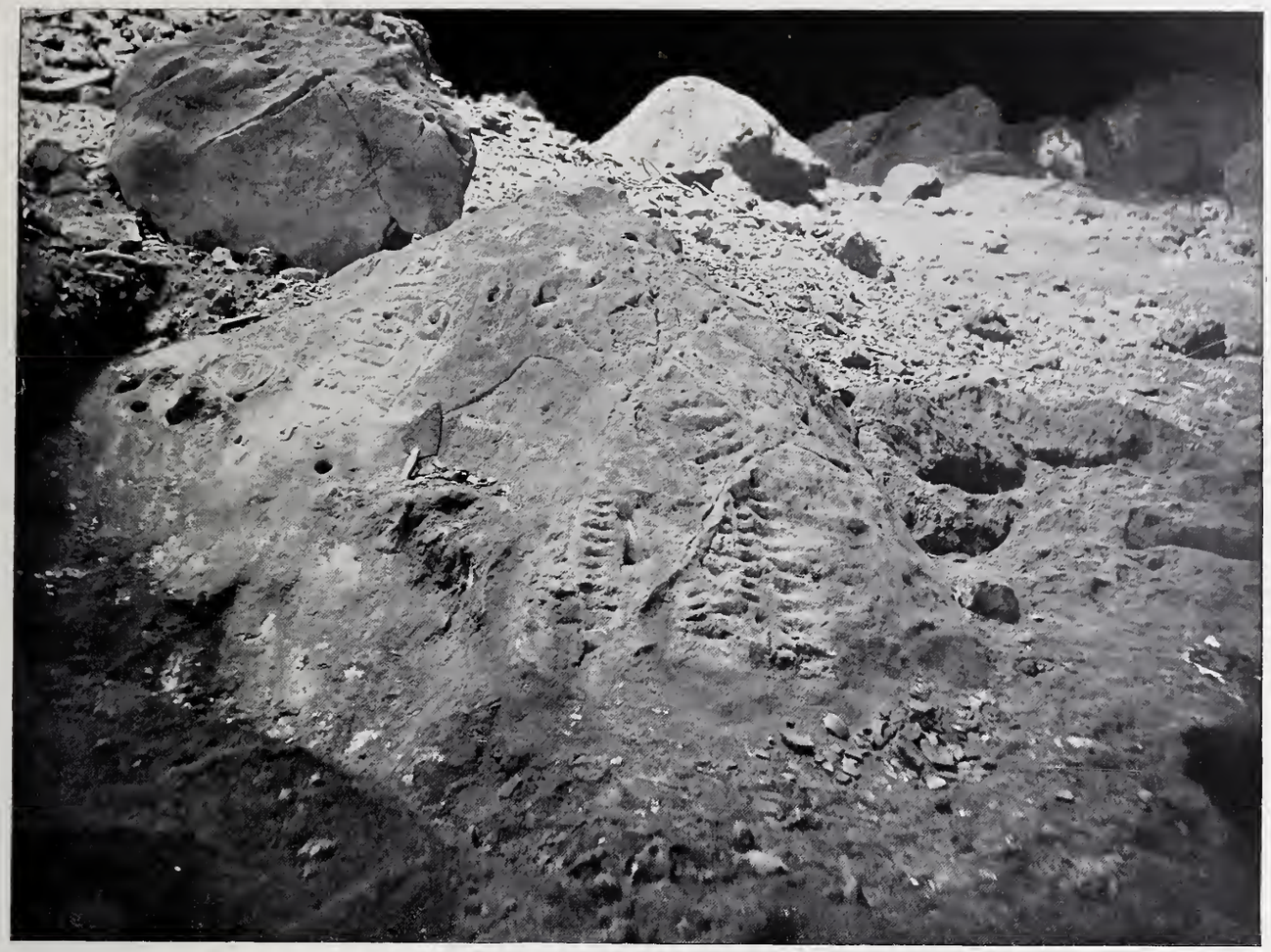


Fig. 1. — Inscription 4 a, Chamber 3, Cave of Loltun.

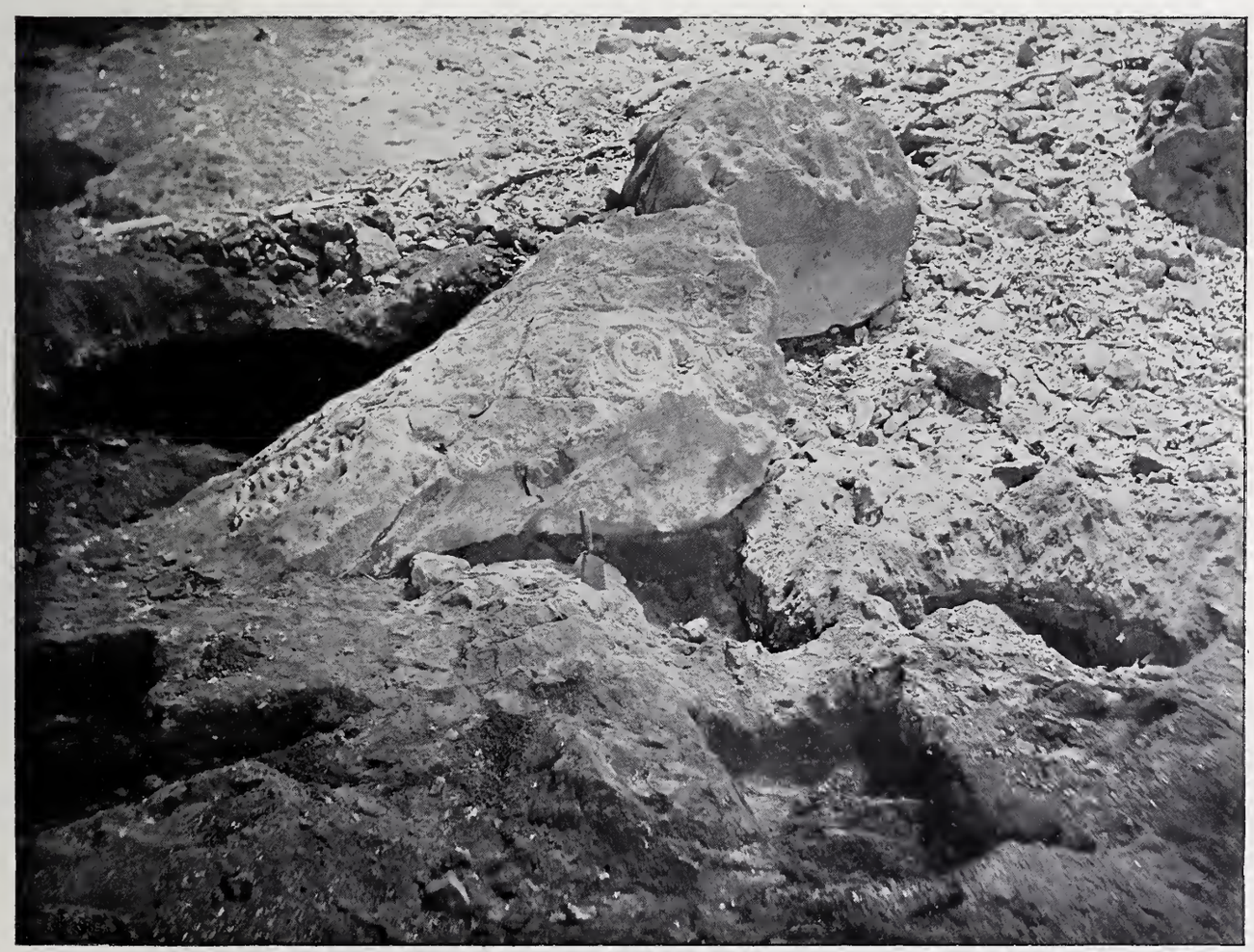
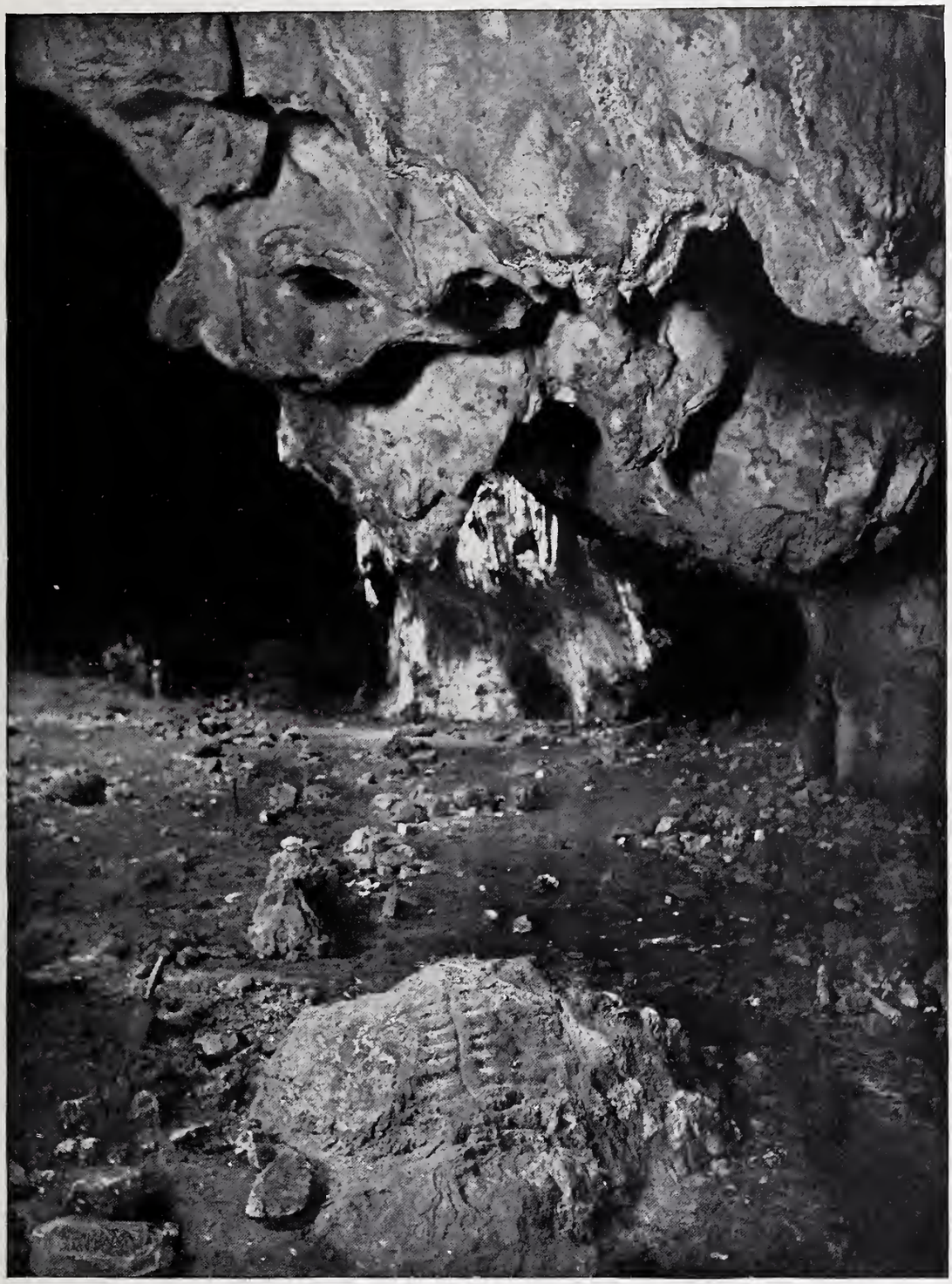


Fig. 2. — Inscription 4 b, Chamber 3, Cave of Loltun.



Inscription 3, Chamber 3, Cave of Loltun.

BAS-RELIEF UPON WALL NEAR ONE OF THE ENTRANCES, CAVE OF LOLTUN.

FIG. 1. — OBJECTS OF TERRA-COTTA, FROM EXCAVATIONS, CAVE OF LOLTUN.

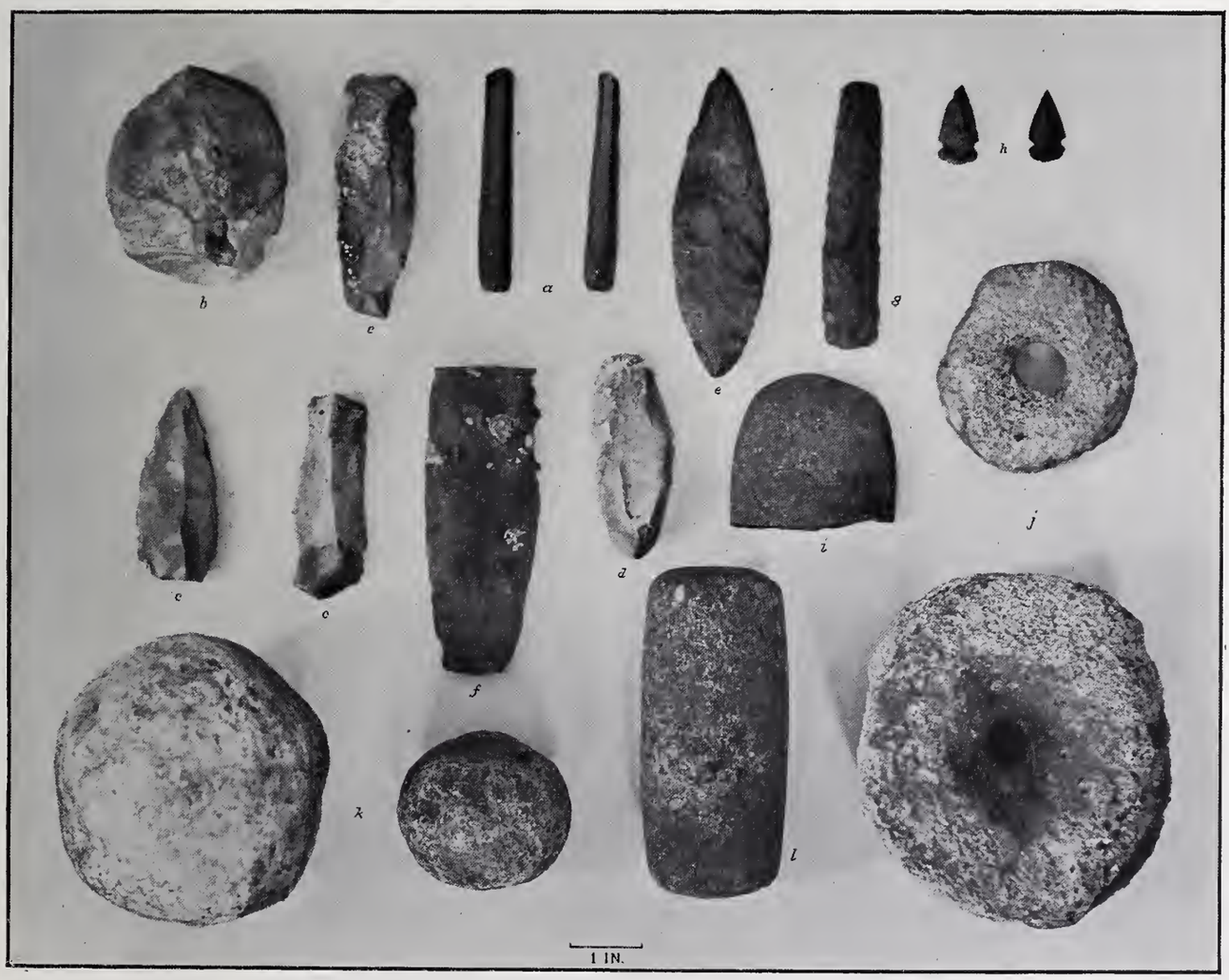


FIG. 2. — IMPLEMENTS OF STONE, FROM EXCAVATIONS, CAVE OF LOLTUN.

Fig. 1. — Objects of Terra-cotta, from Excavations, Cave of Loltun.

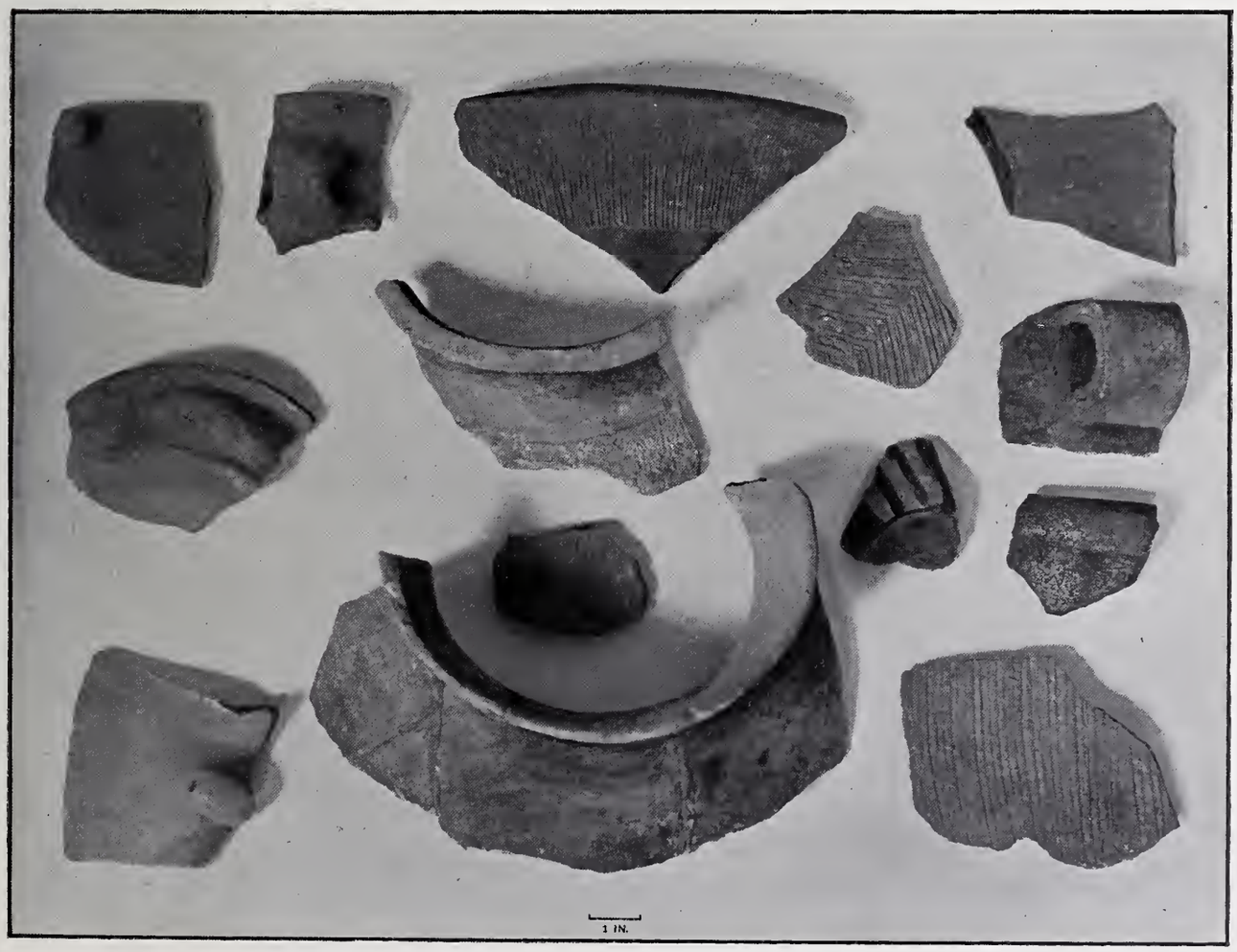


Fig. 2. — Potsherds, from Excavations, Cave of Loltun.

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